FEASIBILITY STUDY FOR MAPPING MULTI-SPECIALTY HOSPITAL PROCESS WITH CMMI

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ABSTRACT

The organization's processes is an important dimensionany organization needs to focus to improve its business. Certification is a proof of high quality service that can win customer trust and confidence. Capability Maturity Model Integration (CMMI) is a process improvement training and appraisal program followed by Software companies' globallyto improve their processes.Healthcare is a sunrise service sector. Indian healthcare is one of the best in the world with good quality medical talent and relatively low cost.At present there is no mandatory accreditation process for hospitals. Vendors of healthcare include a wide range of sectors like Insurance companies, Corporates, Government agencies. If they insist on an accreditation in healthcare, then CMMI can be a good option. If the software industry in India was able to become the best in the world by adopting CMMI practices then why can't Indian hospitals do the same? This research focuses on understanding the processes in multi-specialty hospitals and mapping it to the process areas in CMMI for Services for process improvement.A case study approach is followed, where a 300- bed multi-specialty hospital was chosen and qualitative and quantitative data are collected using direct observation, in-depth interviews and archival document analysis.

Keywords: CMMI, Hospital Process, Process Improvement, Process Mapping, Services

I. INTRODUCTION

There are several dimensions that an organization need to focus in order to improve its business. There are three critical dimensions that organizations typically focus on. They are people, procedures and methods, and tools and equipment. The processes used in the organization connects all these three critical dimensions. Processes allows to align the way we do business. Processes allow to leverage the resources and to examine business trends. In short they add value. So one of the main focus of this thesis paper would be on the processes.

Also certification is a proof of high quality service to win customer trust and confidence and earn the organization a bettercorporate image. Capability Maturity Model Integration (CMMI) is a process improvement training and appraisal program and is widely used by software companies to improve their processes. CMMI is a globally accepted quality standard and is largely adopted by the software companies. Indian software industry is able to meet the international standards by improving on their processes (CMMI Level 5 companies).

CMMI includes the following three areas of focus.

1. CMMI for Development (CMMI-DEV)
2. CMMI for Services (CMMI-SVC), and
3. CMMI for Acquisition (CMMI-ACQ)

Here the main focus is on CMMI for Services (CMMI-SVC). The service industry is an important driver for worldwide economic growth. CMMI-SVC deals with the services and the focus can be on the activities of the service provider.

Indian healthcare is one of the best in the world with good quality medical talent and low cost in comparison with other countries. Indian Healthcare has bright future in international market. It can be seen that over the last few decades, there has been a great improvement in the quality of healthcare services in India. Improvement in healthcare indicators such as life expectancy at birth, infant mortality rates, maternal mortality rate, etc. illustrates this improvement in healthcare sector. In-spite of all these improvement measures there exists a considerable gap in the demand and supply of quality healthcare.

At present there is no mandatory accreditation process for hospitals. It is not mandatory for the hospitals to be certified.Accreditation agencies like National Accreditation Board for Hospitals & Healthcare (NABH) are mainly for infrastructure. Vendors of healthcare include a wide range of sectors like Insurance companies, Corporates, Government agencies. If they insist on an accreditation in healthcare, then CMMI can be a good option because it was successfully implemented in software industry. Therefore if the standards of the hospital processes need to be improved, a process improvement program like CMMI would prove to be a fit benchmark. So it is also possible for the Indian hospitals to excel in the area of process improvement by adopting CMMI practices as done by the software industry in India.

This research focuses on understanding the processes in multi-specialty hospitals that deal with all kinds of departments and mapping it to the process levels in CMMI for Services with a view to improving the processes.

The main objectives of this research would be:

- To understand the processes areas in CMMI for services (CMMI-SVC)
- To understand and analyze processes in multi-specialty hospitals
- To mapping the processes in multi-specialty hospitals to the processes areas in CMMI for services (CMMI-SVC)

A case study approach is followed, where a 300- bed multi-specialty hospital was chosen and qualitative and quantitative data are collected using direct observation, in-depth interviews and archival document analysis.

The next session is Literature review which focus on the works done in the areas of CMMI, process improvements and hospital processes. After Literature review, the methodology is explained followed by the mapping of the processes where process areas in CMMI for services were mapped to the processes in the hospital.

II. LITERATURE REVIEW

2.1 Services

Services are important in the life of any person: food services, communication services, healthcare services, entertainment services etc. The welfare of the people and the society is mainly based on the services. The field of management called Service operations management focuses on the service industries. Service industries play a significant role in the growth and development of any country. If we take the case of any nation, we could see that the service industries are the leaders. They enhance the quality of life of every person. Services also play an important role in providing a stable environment for the economic and social growth. Today the development of a country's service sector is an indicator of its economic development. In India service sector is a vital component of its economy. It contributes to about 60% of gross domestic product (GDP). The service practices

they follow is a major contributor to the performance of the organization and customer satisfaction. The growth in service sector can be attributed to the advancements in technology (mainly information technology).

2.2 Processesand Process Improvement

There are several dimensions that an organization need to focus in order to improve its business. There are three critical dimensions that organizations typically focus on. They are people, procedures and methods, and tools and equipment [1].The processes used in the organization connects all these three critical dimensions. Service organizations are always characterized by the varying processes they follow. Processes allows to align the way we do business. Processes allow to leverage the resources and to examine business trends. Not only service industries but also the manufacturing industries have recognized the importance of the quality in the processes. Process helps and organization to meet its business objectives. It is important for any service to improve upon its processes. Employing any process improvement approach is necessary to achieve customer satisfaction. Therefore it is of critical importance to find the high priority processes and improve on it.

2.3 CMMI

For any service industry, it is very much necessary to develop and maintain quality products and services. In this aspect software industry has been one of the highly developed service industry. From the year 2000 there has been an exponential increase in the software industry as a whole. United States of America has the most advanced information and software technology services industry in the world. There were many process improvement programs adopted by service industries. Capability Maturity Model Integration (CMMI) model is one of the most successful technique and is mostly used by software industry. CMMI was developed by the Software Engineering Institute (SEI). CMMI has outlined several dimensions that any organization needs to focus in order to improve its business [1].CMMI is a process improvement training and appraisal program and is widely used by software companies to improve their processes. CMMI is a globally accepted quality standard and is largely adopted by the software companies. Currently there are three areas in which CMMI is working on.

- Product and service development — CMMI for Development (CMMI-DEV)
- Service management — CMMI for Services (CMMI-SVC)
- Product and service acquisition — CMMI for Acquisition (CMMI-ACQ)

Since we will be concentrating on services in this paper, the CMMI for services (CMMI-SVC) will only be taken care of here. The CMMI-SVC talks about improving the processes for proving better services.

2.4 CMMI for Services

This research considers certain process improvement approaches which are available in the CMMI-SVC. The components are called Process Area Components. CMMI-SVC contains 24 process areas. If we take any organizational processes, there will be several aspects of service development. These process areas describe those aspects. There are 16 core process areas out of 24 process areas. 7 of them are service- specific and one is a shared process area [1].

Application of CMMI for services in software industry is the scope defined for this study. Software industry is one of the key industry in the development of any nation. There are many processes in any software industry where we can apply CMMI. Some of areas are Software Process Improvement in Software Outsourcing, Software debugging and testing, Software Maintenance and Process Improvement, Scrum methodology implementation, etc. All these studies highlights the fact that CMMI enable companies to enhance their performance and rates the maturity of process [2]. There has been several researches conducted in the area of CMMI for services and the implementation. In most of these researches the process specific goals and practices

are initially identified and then analyzed. After which these specific process areas in the problem will be mapped to the key process areas in CMMI. This will help in the improvement of those critical processes by mapping it and comparing it with the actual CMMI processes. In many of the papers there is also the use of Case studies to identify the problems related to process improvement. These case studies also shows various difficulties concerning potential improvements [2]. The processes in the case studies were then mapped to the CMMI processes for the purpose of process improvement and avoiding the difficulties. After the mapping of the processes are done, in the final part there will be an appraisal of the project. Usually this would be done by taking real case studies. This was done in order to find real evidence of a working combination of CMMI and the software processes studied in the research. CMMI-SVC can support software maintenance in the process improvement [3]. The above methods of mapping were used in this also. It was also seen from another research that in a professional software organization most of the missing gaps in the processes were filled through company policies and project practices [4]. The improvements would be then done.

2.5 Health Care Industry

The health care industry is one of the world's largest and fastest-growing industries [5]. If we take the case of most of the developed nations, healthcare industry forms over 10 percent of gross domestic product (GDP). Health care forms an enormous part of a country's economy. Over the past two decades, the health care delivery system has undergone incredible changes which was a result of modern technologies. It is expected that the size of healthcare industry would increase because of the ever increasing population and the spending in this sector by various country governments.

According to the World Health Organization estimates “there are 9.2 million physicians, 19.4 million nurses and midwives, 1.9 million dentists and other dentistry personnel, 2.6 million pharmacists and other pharmaceutical personnel, and over 1.3 million community health workers worldwide”. This make health care industry one of the largest segments of the workforce.

2.6 Indian Health Care Industry

If we look from Indian perspective, in terms of revenue and employment healthcare has become one of our largest sectors. The healthcare industry includes hospitals, medical clinical, medical equipments, medical tourism, life and health insurance, telemedicine etc. Public and private are the two categories of healthcare delivery system in India. Indian healthcare is one of the best in the world with good quality medical talent and low cost in comparison with other countries. A large pool of well-trained medical professionals are the assets of Indian healthcare sector and this provides a competitive advantage compared to hospitals in other countries. Over the last few decades, there has been significant increase in the quality of healthcare services in India. Also, another important feature of Indian healthcare sector is the low cost compared to peers in Asia and Western countries. For example it would cost only one-tenth of the cost for a surgery in India compared to that of the US or Western Europe. Indian Healthcare has bright future in international market.

In-spite of all these improvement measures there exists a considerable gap in the demand and supply of quality healthcare. There were many efforts to foster quality improvement in healthcare. But it has been seen from many of the researches that there has been that substantial shortcomings in the delivery of effective and reliable health care [6].

2.7 Hospital Processes

Patient safety and the quality improvement in larger hospitals can be done better by the development of general and outcome specific climates. Also in the case of small hospitals instead of investing in cultural

transformations, they can focus on scarce resources on using specific practices for specific patient needs. Thus we will be able to apply the operations management in the processes in hospitals [6].There are a wide range of areas in a healthcare industry where we can work on the improvement of the processes and service quality.

As an example of a process in a hospital we can consider the discharge and the billing process in a hospital and the customer satisfaction associated with these processes. Discharge of a patient from a hospital is one of the most important process in a hospital. Discharge and the billing process are the final processes that a patient has to experience in any hospital. If there is any problem in these processes, even though all the other processes went well, the customer satisfaction will get affected. This calls for an efficient process. The delay in discharge and the billing processes leads to dissatisfaction of customers (patients) and can badly affect the goodwill of the hospital [7]. In many of the studies it was seen that there is a delay in all the steps in hospitals discharge process in many Indian hospital [8].

Some process improvement methodologies like six sigma can be applied to the processes in the hospitals. Six Sigma is a set of techniques and tools for process improvement. Certain studies were conducted in Indian multi-specialty hospitals using the approach of six sigma. For instance in a study on reduction of waiting time at the outpatient services of the Cardiology department of a large university teaching hospital, there were significant reduction in waiting time by using the six sigma approach [9]. A significant reduction in waiting time for getting the lab results was also achieved. As a result of the study several modifications were done in the OPD such as modification of forms, appointment of new staffs to handle telephones, appointment of biochemistry analyst etc. [9].

It is seen from all these studies that improvement in the processes is critical in the smooth functioning of any organization and therefore in the case of multi-specialty hospitals also the situation is not different. Hence in order to improve the processes in a systematic way we can use CMMI for services.

From studying the papers it was found that none of them talks about the implementation of CMMI in hospitals. If we want to improve on the standards of the hospital processes they would need a process improvement program like CMMI. This research is about analyzing this feasibility of implementing CMMI in hospitals in India.

III. METHODOLOGY

The research question is to analyze the feasibility of mapping the processes in the multi-specialty hospitals to the process areas in the CMMI for Services so as to optimize the processes in the hospitals.

a) The unit of analysis in this research is a multi-specialty hospital

b) Qualitative data (like hospital process) and quantitative data (like number of departments, number of beds) were collected.

c) The data collection methods used were direct observation, in-depth interviews and archival document analysis.

d) For the analysis qualitative data was used. The quantitative data were used as supporting data.

IV. PROCESS MAPPING

The methodology of process improvement follows certain steps. They are:

- Identify the process
- Identify the ownership

- Resource allocation (In accordance to strategic importance)
- Measure the performance
- Process Improvement

There are 24 process areas in CMMI SVC. The process areas were mapped with the multi-specialty hospital processes. The mapping is given below in the table. The Table 1 gives all the 24 CMMI process areas and the processes in hospitals which are mapped to these processes. For the processes which were not mapped, suggested Hospital processes are given. It is done so as to improve upon in this area.

Table 1: Process mapping

SL. No.	CMMI Process Area	Hospital Process Mapped	Suggested Hospital Process
1	Capacity and Availability Management (CAM)	Pharmacy process	---
2	Causal Analysis and Resolution (CAR)	Consultation of doctor by patient	---
3	Configuration Management (CM)	Hospital Information system	---
4	Decision Analysis and Resolution (DAR)	---	Benchmarking doctor performance
5	Incident Resolution and Prevention (IRP)	Emergency care process	---
6	Integrated Work Management (IWM)	Overall hospital organizational structure	---
7	Measurement and Analysis (MA)	Hospital Information system	---
8	Organizational Process Definition (OPD)	Standard process like consultation with doctor, lab tests, emergency care	---
9	Organizational Process Focus (OPF)	---	Strategic decision making by top management
10	Organizational Performance Management (OPM)	Analysis of standard processes like consultation	---
11	Organizational Process Performance (OPP)	---	Clinical quality of care
12	Organizational Training (OT)	Doctor and nurses training	---
13	Process and Product Quality Assurance (PPQA)	Overall hospital service	---
14	Quantitative Work Management (QWM)	---	Healthcare waste management
15	Requirements Management (REQM)	Availability of doctors	---
16	Risk Management (RSKM)	---	Patient Safety Training
17	Supplier Agreement Management (SAM)	Supply to pharmacy	---
18	Service Continuity (SCON)	Service after a disaster	---
19	Service Delivery (SD)	Medical departments	---
20	Service System Development (SSD)	Pharmacy, shelves, delivery of drugs	---
21	Service System Transition (SST)	Implementation of new law for nurses	---
22	Strategic Service Management	New services like modern	---

	(STSM)	equipments, new departments	
23	Work Monitoring and Control (WMC)	---	Infection prevention and control
24	Work Planning (WP)	Doctors to different departments	---

The description of the processes is as follows. In all the process area mapping written below, the format followed is that first paragraph describes the purpose of that particular process area and the paragraph following that explains the process mapping.

4.1. Capacity and Availability Management (CAM)

This is a Project and Work Management Process Area at Maturity Level 3. This area ensure effective service system performance and ensure that resources are provided and used effectively to support service requirements.

In the multi-specialty hospitals, the capacity could be mapped to the pharmacy i.e. to ensure that sufficient resources (medicines, pharmacists, oxygen etc.) are available on a regular basis at an appropriate cost. Capacity here refers to the ability of the pharmacy to provide medicines to the patients without any failure. The availability management can be mapped with the availability of the doctors at various departments. The process of scheduling the allocation of doctors to different departments on particular days strengthens this process area.

4.2. Causal Analysis and Resolution (CAR)

This is a Support Process Area at Maturity Level 5. Causal Analysis and Resolution (CAR) is the process area which identify causes of selected outcomes and take action to improve the performance of process.

In the multi-specialty hospitals, the Causal Analysis and Resolution (CAR) can be applied in the process of a patient meeting the doctor. At present time is wasted when the Medical records department takes the file of the patient to the doctor before the patient meets the doctor. This can involve some extra labor also. So the cause of this extra time taken can be analyzed with the help of analytical tools and resolution can be provided. A suggestion in this case is to provide the patients with a card which has data embedded in it and when a patient is meeting the doctor, when the patient swipes in the card the doctor will get all the information about the patient and also doctor will be able to access his medical history.

4.3. Configuration Management (CM)

This is a Support Process Area at Maturity Level 2. Configuration Management (CM) establish and maintain the reliability of services or products. It uses identification, control, and audits of the configuration.

In multi-specialty hospitals the hospital data and the patient data is managed by an information system called Hospital Information System (HIS). It focuses not only on the hospital administration needs but also on the patient database management. The Medical records department records the data of patients in this digital format. The HIS is also used by the laboratories (as shown in the Fig. 1) which upload the lab test results to the system, as soon as the results of the lab tests are available, for easy access to the doctors. It is also necessary to maintain the different methods to ensure the completeness and consistency of data.

4.4. Incident Resolution and Prevention (IRP)

This is a Service Establishment and Delivery Process Area at Maturity Level 3. Incident Resolution and Prevention (IRP) is the process area of CMMI SVC which resolves the service incidents effectively and appropriately.

Incidents mentioned here are those events if not addressed would disrupt the service commitments of the service provider. So timely and effective addressing of incidents is necessary. In multi-specialty hospitals an incident

like this scenario could be emergency cases of admitting the patients to the Intensive Care Units. To handle the situation effectively the emergency cases are directly moved to the corresponding specialty departments and admitted to the ICU. Here the normal process of patient meeting the trainee doctors is bypassed considering the criticality of the incident. Also the proper communication the status of incidents to relevant stakeholders is an important activity in Incident Resolution and Prevention. This is taken care by proper communication between the departments and also with the people along with patient.

4.5. Integrated Work Management (IWM)

This is a Project and Work Management Process Area at Maturity Level 3. Integrated Work Management (IWM) helps in the development of an integrated and defined process adhering to the set of standard processes followed by the organization.

In the case of multi-specialty hospitals, this process area is associated with the overall organizational structure of the hospital. It deals with the involvement of relevant stakeholders like owners, doctors, nurses, other staffs, patients, etc. in the hospitals set of standard processes. The hospital organizational structure is mentioned as block diagram (Fig. 2). The management of the cost, staffing, scheduling, etc. in hospitals are associated with the work management. In hospitals the coordination of different activities is needed for ensuring the quality of work. The involvement of all the stakeholders is necessary in the work structure coordination.

4.6. Measurement and Analysis (MA)

This is a Support Process Area at Maturity Level 2. Measurement and Analysis (MA) is that process area which support the information needs of the management by developing and sustaining a measurement capability.

Taking the case of multi-specialty hospitals, the Hospital Information system can be mapped with Measurement and Analysis. The process area include specifying measures, data collection methods, data storage, reporting etc. which we can map to the process by which the Medical records department collects data from patient, stores the data, retrieve data, sharing of data (with other departments) etc. A proper procedure and process for the maintenance of data is essential. The data in the information system can be made available to multiple levels to minimize re-work on data.

4.7. Organizational Process Definition (OPD)

This is a Process Management Process Area at Maturity Level 3. The processes in the organization, different standards in work environments, rules and regulations etc. are established and maintained by the process area Organizational Process Definition (OPD).

Multi-specialty follows certain pre-determined set of processes and procedures which are well defined. There are specific set of standard processes for different areas, for example: consulting a doctor, conducting laboratory tests, emergency cases, etc. The execution of these processes provide long-term benefits to the organization (hospital). These processes also have sub-processes. There are work environment standards and rules and guidelines that has to be followed in the processes. The proper documentation of these set of standard processes will help in the checking any gaps in the process and would help in process improvement.

4.8. Organizational Performance Management (OPM)

This is a Process Management Process Area at Maturity Level 5. The performance of every organization should be such that it should meet its business objectives. This is managed by Organizational Performance Management (OPM).

Earlier when discussing the process area- Organizational Process Definition, the mapping of processes in multi-specialty hospital was done. In this process area we can map the analysis of that processes in multi-specialty

hospitals to identify the gaps in performance. This is done to check whether the business objectives are being met. The analysis of the processes can be helpful in deciding the potential areas of improvements to close the gaps. The service quality of the hospitals can be improved. This will increase the productivity and efficiency of the hospital and would result in better customer (patient) satisfaction.

4.9. Organizational Training (OT)

This is a Process Management Process Area at Maturity Level 3. The role of Organizational Training (OT) is to develop knowledge and skills of people in the organization, so that the will be able to perform their roles effectively and efficiently. Organizational Training is also essential for supporting the strategic business objectives of the organization. In a multi-specialty hospital there is proper training for the people associated with the hospitals. There are medical colleges associated with these hospitals (with well-equipped labs and libraries) where the proper training is given to the doctors and the nurses on performing their jobs effective and efficiently. The people other than doctors and nurses are also given proper training for their work. As a part of the training the trainee doctors are the people who are consulted by the patients when they arrive at the hospital. It is the trainee doctors who redirect the patients to different departments depending on the medical conditions.

4.10. Process and Product Quality Assurance (PPQA)

This is a Support Process Area at Maturity Level 2. Process and Product Quality Assurance (PPQA) is for assuring the quality of the products and services by evaluating them against standard procedures.

In a multi-specialty hospital quality assurance plays an important role in the service delivery. This can be mapped with the overall service provided by the hospital and can be further broken down in to the levels of processes followed. The quality assurance of the products like medicine in the pharmacy, laboratory equipments results in the delivery of high class products and services. Another process which can be mapped with this process area is the assurance of quality in the information system.

4.11. Requirements Management (REQM)

This is a Project and Work Management Process Area at Maturity Level 2. Requirements Management (REQM) is the process area to manage requirements in the processes for its smooth working. In the multi-specialty hospital we can map the requirements of the doctors by specific departments, for the hospital service delivery to function accurately. For example a particular doctor will be required at surgery on one day, outpatient department on another day, medical college on other day, etc. Therefore the requirements must be aligned with the work process. A similar mapping can also be done with the management of pharmaceutical medicines, laboratory equipments etc.

4.12. Supplier Agreement Management (SAM)

This is a Project and Work Management Process Area at Maturity Level 2. Supplier Agreement Management (SAM) deals with the management of acquisition of products and services from suppliers. Mapping of this process area can be done against the process by which various suppliers are managed by a hospital. Some of the important suppliers to a multi-specialty hospital are pharmaceutical companies, medical equipment manufacturers etc. The mapping to this process area also addresses the acquisition of these products which are included in the service system.

4.13. Service Continuity (SCON)

This is a Project and Work Management Process Area at Maturity Level 3. The goal of Service Continuity (SCON) is to establish and maintain plans that would ensure continuity of services in case of disruption of

normal operations. In a multi-specialty hospital this process area can be mapped to the activities that the hospital staffs plan and rehearse to restore the service/ system after any natural disaster or terrorist attack.

4.14. Service Delivery (SD)

This is a Service Establishment and Delivery Process Area at Maturity Level 2. The aim of this process area is to deliver services in accordance with service agreements.

In a multi-specialty hospital the mapping would be to processes in the different medical departments. For example if we take Cardiology department, the service delivery includes scheduling of the doctors for cardiology, consultation with patients, delivering drugs etc. It also includes processes like monitoring the supply of medicines, tracking customer satisfaction etc. Here management of requests can be prescription from other departments like neurology or respiratory medicine.

4.15. Service System Development (SSD)

This is a Service Establishment and Delivery Process Area at Maturity Level 3. Design and development, analysis and integration of the service systems. This is done in order to satisfy the service agreements.

In a multispecialty hospital the different service system includes facilities such as the pharmacy, shelves and equipment for measurement, delivery of drugs etc., doctors, nurses, pharmacists, therapists, and technical specialists. It also includes various processes like diagnosing, prescribing, drug delivery, scheduling, planning, budgeting, and operating.

4.16. Service System Transition (SST)

This is a Service Establishment and Delivery Process Area at Maturity Level 3. In the cases where the service system components are significantly changed, then the deployment function along with the management of ongoing service delivery, is taken care by the Service System Transition (SST).

In a multi-specialty hospital, if a new law comes that nurses are no longer able to direct certain medicines, except in the presence of a pharmacist, then we can apply Service System Transition to the scenario. There would be changes in the processes and the system. Service System Transition can be applied to make the changes to people and processes.

4.17. Strategic Service Management (STSM)

This is a Service Establishment and Delivery Process Area at Maturity Level 3. The establishment and maintenance of standard services is done by Strategic Service Management (STSM). This will be in line with the strategic needs and plans.

In multi-specialty hospitals, the management implements new services (use of state-of-the-artequipments for diagnosis, starting new departments etc.) to meet the needs of its customers. They analyze market data strategically to review these services to meet those needs. Service-level agreement is a standard service. From the analysis they can know about other requirements also.

4.18. Work Planning (WP)

This is a Project and Work Management Process Area at Maturity Level 2. The establishment and maintenance of plans that define work activities is done by Work Planning (WP).

In the case of multi-specialty hospital the work week planning of the different doctors to various departments can be mapped to the process area of Work Planning.

4.19. Other Process areas

Out of the total 24 process areas in CMMI-SVC, 18 were mapped as given above. The remaining 6 are: Decision Analysis and Resolution (DAR), Organizational Process Focus (OPF), Organizational Process

Performance (OPP), Quantitative Work Management (QWM), Risk Management (RSKM) and Work Monitoring and Control (WMC). There areas were not mapped because the corresponding process areas were not identified. The table 1 shows the suggested hospital process areas which can be mapped with these 6 process areas so that the process ownership can be properly assigned and do proper resource allocation which will result in process improvement.

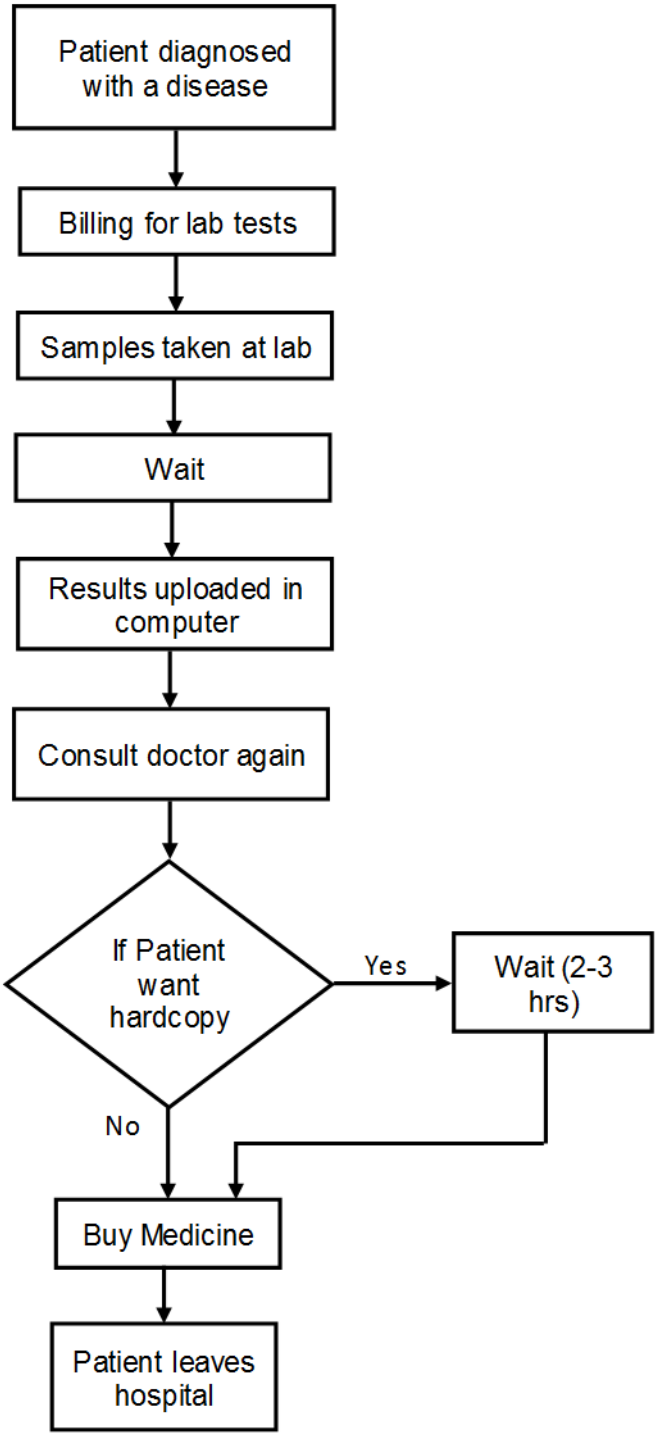

Fig. 1: Laboratory Process

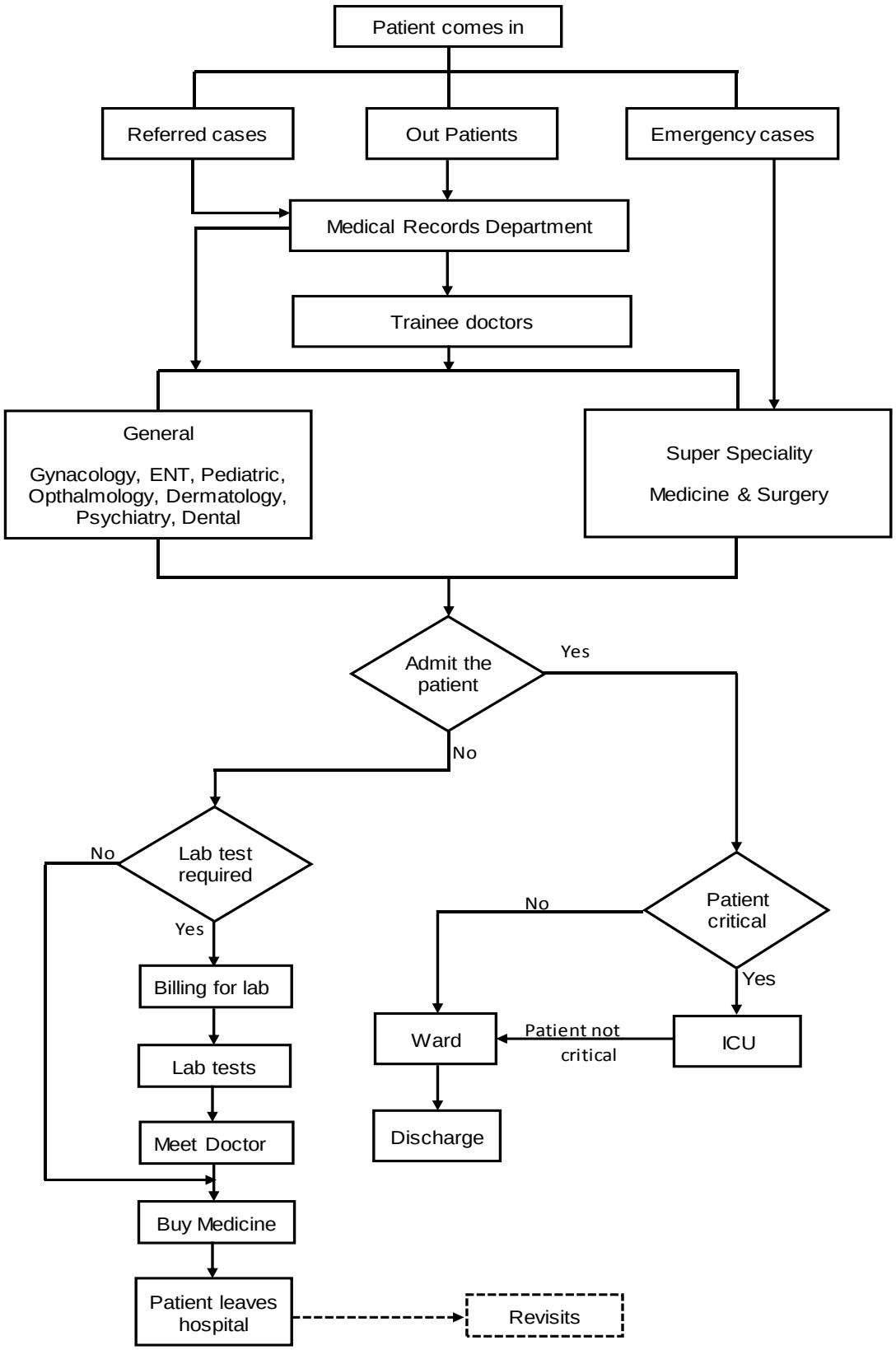

Fig. 2: Hospital Process flow diagram

V. CONCLUSION

In any industry, process improvement plays a major role in the success of the business. It is necessary for improving the customer satisfaction, reliability, efficiency and effectiveness of process, accountability etc. As discussed in the literature review, CMMI is an effective method for improving the processes by the implementation of various process areas. And implementing CMMI for services on hospitals process would improve the hospital services. In this paper, an attempt was made to map the processes in a multi-specialty hospital with that of the process areas of CMMI for services. 17 out of the 24 core process areas were mapped with the hospital processes. It can be concluded that it we will be able to implement CMMI for services in a multi-specialty hospital. So the Indian hospitals should adopt the system of CMMI certification for its service and improving their service. By the implementation of CMMI the hospitals can improve their standards and with this Indian hospital industry can match up with the hospitals in the West in the processes.

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